months ago I had the pleasure of paying a visit to Mr. Salt's establishment at Ferniehurst, and I was both surprised and pleased with his plants of D. Falconeri in particular, as well as with very many other well-grown examples, in his extensive and fine collection. In travelling through the provinces, as well as the metropolis, we frequently see remarkable instances of the most successful cultivation, sometimes arising from suitable houses, sometimes from the intelligent application of knowledge of the peculiar conditions under which plants are found in their native habitat, &c. And in an occupation like gardening, where so much remains to be learned from experiment, it is very important to be furnished with information (which is always acceptable) to guide us in our application of the best means of developing those beauties which it is our pleasing province to nurture and sustain. Sometimes we are impelled forward by seeing we are behind others, still we may go wrong by being satisfied with results below what it is possible to realise. No doubt some plants die out, and are lost because they are mismanaged, or their striking beauties never fully developed; and others, that remain in cultivation, we may at times find so very much finer than ever we expected to see them, that we then regret their beauties have not been before more fully developed. I might give an instance of the Calanthe Veitchii as a case in point; this is one of those superb hybrids which has resulted from the skill and perseverance, of Mr. Dominy—no winter-blooming Orchid can compare with this "King of Beauty." Now we find it described in books as a plant producing flower-spikes 18 inches in length, and as such it has been sold and accepted as a real gem; yet this magnificent Orchid has produced flower-spikes 5 feet long, branching, and covered with bloom, thus proving its capabilities to have been very much underrated, and that it is possible to grow it as above, by treating it as a terrestrial Orchid—potting it in rough peat and fibre, turfy loam, &c., with bottom-heat and liquid manure during the growing season. I do not say that small pseudobulbs can carry so much bloom at once, but I do assert that by perseveringly cultivating this lovely gem, we may still further realise how fascinatingly beautiful the Orchids are when well grown, and how desirable it is to note results at home, look about, and learn what can be done, for we may yet become convinced that many of the difficulties which surround Orchid culture are of our own creating, and that they may yet be grown with as much ease and certainty as any other exotic. *William Payne.*

Potatos.—I am induced to trouble you with a few lines, to ask if any of your numerous readers who are experienced Potato-growers, have often met with what is now, on a somewhat unusual scale, going on in my garden. About seven weeks ago I had planted eight short rows of the Mona's Pride Potato. They were taken from a hamper that had been kept in a dry cellar, and were somewhat freely grown, but in other respects very sound seed. Not showing themselves above ground excepting at rare intervals, I yesterday dug up two of them, and found that each set had produced young Potatos, some of which were of considerable size, nearly that of a hen's egg. From the appearance of but very few indeed out of the ground, I am inclined to think the same process is going on with a patch of Ashleaf Kidneys and Ashtop Flukes. I have inquired of a neighbour to whom I gave some seed of Mona's Pride, and I find there is the same entire absence of aboveground growth in at least nine-tenths of the seed, and the same underground progress. An experienced gardener, Mr. Reed, formerly at the Abbey here, tells me he has found instances of such growths before, but not on the scale they now are showing here. Can any reader of your columns kindly inform me if, this year, the growth I have described is common elsewhere, and what will be the probable crop under the circumstances of the absence of any growth aboveground? I may add that the seed had not been sprouted before being planted. *Edwd. Puttock, Flaxley.* [Will some of our friends kindly state their experience? EDS.]

Unfruitful Vines.—I have 10 Vines that have been planted (as far as I can learn) about 11 years, and which have not produced more than 50 lb. of Grapes. The borders in which these canes are planted, are composed of a strong clay loam, about 4 feet deep, and 20 feet wide, but I am told that there is no drain at the bottom of the borders, though there are plenty of stones, lime rubbish, &c. The Vines are now showing a few bunches, but I doubt if they will come to any size. Each cane is full of aërial roots, from the bottom to the top. The house in which they grow faces south-west, and very little heat has been given. Do you think it possible to get them into a fruitful condition, by taking them up and replanting them? The canes are not very strong. *Cornwall.* [Vines that have been planted 11 years, and have only produced 50 lb. of Grapes, are certainly not in a satisfactory condition. From your account there can be little doubt but that the border is in fault. In the first place the clay loam is too heavy, and 4 feet deep of it is almost double the depth required, and the drainage is imperfect. Your only remedy is to take up your Vines early in autumn, carefully renew your border, giving perfect drainage in the first place—a very important matter in your locality; then 2 feet of brick rubbish, and about 2 feet of soil composed of a good portion of porous materials. We would recommend you to have your border raised above the surrounding levels. You might work up some of the roots by judicious top-dressings, but we do not think you would be much benefited thereby. *B.*]

Adnation in Conifers.—I was interested in the remarks of the *Gardeners' Chronicle* some months since on my notes on "adnation in Coniferæ" before the Academy of Natural Sciences of Philadelphia. My paper on the subject was presented to the committee of the National Association for the Advancement of Science, and no copy was preserved. The verbal remarks I made at the meeting referred to, and reported by the secretary, are accurate so far as they go, but of course do not enter into the details of the subject so fully as the paper itself. The Transactions of the Society will not appear till next August; when it does I think the matter will be made clearer than is possible from the material at present made public. In the meantime the notice has suggested to me a few further points which may have an interest for the readers of the *Gardeners' Chronicle.* The theory sought to be established is, as the writer in the *Chronicle* correctly stated it, "that the power of branching in Coniferæ (perhaps in all other trees) is in proportion to vigour, and that in proportion to vigour are the leaves of Coniferæ adnate with the axis or stem." The writer in the *Chronicle* objects to the term "adnation." The cases cited, he thinks, are more properly instances of "imperfect separation." This criticism is just. If we are to follow classical Latin, and use the word as Pliny would in speaking of the adnation of the Mistleto to the Oak—as of something once distinct but now united—it is not right to employ the term to designate an union of parts which were never separate. Yet it may be excusable, as the term has been so used by others before me, and is so used in common every-day English. We say of the Siamese twins that they are two men "united" together, but as union implies adhesion of separate parts, and as these twins were never separate, the term as applied to them is not critically correct. We also say of an Apple that the calyx is adnate with the ovary, or of the anthers of Magnolia that they are adnate with the filament, in exactly the same sense as I say the leaves of Coniferæ are adnate with the stem. We use the term as implying a practical union of parts which are theoretically distinct. The writer thinks my point not well taken, in so far as I say that Thuja ericoides (Hort.) is less branching than the Thuja occidentalis (its parent) in its more advanced stage, and that the Glyptostrobus sinensis is more branching than Taxodium distichum. The remark that the "Glyptostrobus at Kew is not more branching than the Taxodium growing near it," shows that the difference between us is simply as to the meaning of the words we enploy. The writer in the *Gardeners' Chronicle* had "permanent branches" in his mind at the moment. I had "branchlets," most of which are deciduous at the fall of the leaf. The reviewer is right also in this as in the former objection. There is in the United States, as at Kew, little difference in the permanently brachiate character of the two; but in the branchlets to which I had reference the difference is very great, as will be readily seen in a shoot during the growing season. In Taxodium a branchlet springs from the axil only every eighth or tenth leaf, but the Glyptostrobus branches from nearly every one. In a paper presented to the Academy of Natural Sciences since the remarks referred to, I have been able to show in a series of forms—all raised from Taxodium—a regular gradation of the foliage to Glyptostrobus, and in all cases a gradation of this brachiate character regularly accompanied the other fact (see "Proceedings Ac. Nat. Soc. Phil.," October, 1868). With regard to Thuja ericoides its branching profusion is only apparent. It does appear as dense or more compact than the mature form, but the mature common form will be found to have branchlet from every other pair of axils, giving it in fact the well-known flabellate form. T. ericoides will be found to branch only at every eighth or tenth node, on the average. It seems as branching, because none of its branchlets are deciduous; the few it has remain, and so far makes the criticism just. As these branchlets are so many of them deciduous, it may be objected to that I regard them as parts of the axial system of the plant. Ought they not to be treated rather as of a phylloid character? I have shown ("Proceedings American Association," 1868), that the so-called leaves of Pinus are branchlets, and confirmed, by specimens exhibited with the paper, a previous observation of Dr. Dickson, of Edinburgh ("Proceedings of London International Botanical Congress"), that the so-called leaves of Sciadopitys will branch from their apices into perfect young plants. It might seem sufficient to prove that the deciduous branches of Taxodium and Thuja were rightfully branches rather than leaves, to point to the fact that some of them remain to be permanent branches; but to establish the fact that there is no organic reason why they are not all permanent branches, it is only necessary to go to the propagator. Every small particle of a flabellate shoot of Arbor-vitæ will graft and grow as readily as the strongest stem. I have not tried the branchlets of Glyptostrobus, but have no doubt they would propagate as well. The knowledge I have gained of the woody character of the so-called leaf fascicles in Pinus I have also turned to excellent practical account. By selecting extra strong shoots, and giving them by art a still greater vigour, I am enabled to make the axis develop in each fascicle. These fascicles are then taken out and budded on other stocks in the usual way of budding. (We do not take out the wood in budding in the United States.) I was only able to perfect this plan last year, so have not put it into varied practice; but I have Austrian Pines successfully worked on Scotch Pines in this way, and there is no reason why it may not be applied to any others, and rare Pines become as rapidly plentiful as new Roses or new Pears. My own propagators beg to have this fact kept as a trade secret, but I would rather use it in connection with these physiological discoveries, and if it, as I hope to live to see it, prove the means of hundreds being able to enjoy the beauty of many rare Pines now beyond their means, I shall have some reward. The "leaves" of Pines, and the deciduous "branchlets" of Thuja and Taxodium, being shown to be all of an axial or woody character, it may not be amiss to account for their deciduous leaf-like behaviour. Some years ago I took a measure once-a-week for three years of the rate of circumferential growth during the growing season of a tree of Populus monilifera. The results were published in the "Proceedings of the Philadephian Academy," and I believe have been briefly noted in the *Gardeners' Chronicle.* A result of this experiment was the learning the fact that the branch will often increase slightly in girth after all functional activity has ceased in the leaf. I could make no use of the fact at the time, but I have since found it of value in enabling me to account for the dry leaves of some trees remaining on all winter. I have two trees of Quercus robur pedunculata before my library windows. One holds most of its leaves all winter, the other sheds its leaves in due season. In the last the wood (or bark?) swells slightly after circulation has ceased in the leaf, and separation takes place by the unequal expansion of parts. In the other case the growth or expansion in the wood ceases before or at the same time with the cessation of vital function in the leaf, hence there is no power to throw off the leaf until the return of the regular expanding time in spring. The fall of the branchlets in Taxodium and Thuja is accomplished in just the same way. This is the mode in which they are thrown off; the reason why the sap stops just at this particular point or articulation has never been so clear to me. I had laid myself out at starting to give in this note some remarks on the change of form in other plants besides Coniferæ, particularly in Ferns, all in connection with suppression, adhesion, or "imperfect separation" of parts in relation to their several stages of vigour, constitutionally or otherwise; but am alarmed at the great length this note has already assumed. *T. M., Philadelphia, United States, America.*

The Formation of Mould by Worms.—As Mr. Fish asks me in so obliging a manner whether I continue of the same opinion as formerly in regard to the efficiency of worms in bringing up within their intestines fine soil from below, I must answer in the affirmative. I have made no more actual measurements, but I have watched during the last 25 years the gradual, and at last complete, disappearance of innumerable large flints on the surface of a field with very poor soil after it had been laid down as pasture. I have also purposely covered a few yards square of a grass-field with fine chalk, so as to observe the worms burrowing up through it, and leaving their castings on the surface, which were soon spread out by the rain. The Regent's Park in early autumn is a capital place to observe the wonderful amount of work effected under favourable circumstances by worms, even in the course of a week or two. My observations in Staffordshire were chiefly made on poor, sandy grass-land, and I think that Mr. Fish will find that the proportion by weight or measure of carbon in poor soil is but small, and that the decay of the Grass will account for but a small proportion of the matter successively deposited on the surface. Except when peat or peaty soil is forming, the carbon-compounds seem soon to be decomposed and disappear. Judging from the quick rate at which I have proved that the surface becomes covered with fine soil, if the mere decay of the Grass were as effective as Mr. Fish thinks, many feet in thickness would be formed in the course of a few centuries—a result which would be as surprising as delightful to the dwellers on poor land, or indeed on any land, which is never overflowed by mud-bearing water. In ordinary soils the worms do not burrow down to great depths, consequently fine vegetable soil is not accumulated to any inordinate thickness. *Charles Darwin, May 9.*

The Royal Caledonian Show.—Looking to the mass of matter of general interest that has to find a place in the *Gardeners' Chronicle*, correspondents, I presume, generally, and the writer among them, are compelled to epitomise—show reports particularly, and therefore many things worthy of notice are passed over. The Cucumbers shown by unsuccessful prize takers at the above show, commented upon by "Observer" at p. 501, were on that account not enumerated. The writer, in addition to that, fairly omitted noticing an excellent dish of Prince of Wales Strawberry, furnished by Mr. Thomson, of Dalkeith. Instead of "Seakale and Beet," as printed in the report, it should have read Seakale Beet, a palatable looking vegetable. While the writer had, and has, no wish to underrate the professional skill of southern men, he wished to show that the northerners, with a less hospitable winter and spring climate, can give a good account of themselves throughout the season—autumnal kitchen gardening not being their only *forte. Reporter.*

Dendrobium Falconeri.—Mr. Anderson gives as the grand secret of successful culture of this plant a low temperature and ample moisture. The temperature of the season of rest does not need discussion—that all will say should be low; let us, then, confine our attention to the season of growth. He advises the cool end of a Cattleya-house, but he does not tell us what is the heat, in figures, of either end. Now, the beginning and ending of my key to Orchid-growing made easy is, growing them in my Pine-house; if they are Cattleyas, they go there, and the Dendrobiums are equally honoured; and should the temperature run up to 120°, I don't mind, so that it is upon a good bright hot day, and air is given; nor do the Orchids seem to dislike it any more than the Pines. Gardeners I do not require to get accustomed to such a heat—they can do their work before and after the heat and burthen of the day. We are now speaking specially of Falconeri, but albo-sanguineum, Devonianum, and formosum are said to be difficult of culture; the only one I have had trouble with is infundibulum, which I am trying with the Odontoglossums. Granted that those I have named require the most moisture, what amount of increased moisture can the atmosphere contain as it rises in temperature? and what is the summer temperature of the natural home of these Orchids? I should be very glad to know. Two years since I

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